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CONTRIBUTIONS TO THE PHYTOGEOGRAPHY OF THE TUTOVA HILLS

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In 1951 we investigated the forests surrounding the localities of Fintinele (Muncel forest), Stincaseni (Vidrascu forest, Iaser woods, Corodesti forest, Cociuba forest, Mangal forest), Micesti (Micesti forest), Floresti (Floresti forest), and Chitoc (Lipovatului forest).

In November of the following year we investigated the forests surrounding the localities of Bancesti (Fintinele forest), Corodesti (the forests on Magura hill and Bulbucilor), Micesti (Micesti forest), Cotirlaci (Cotirlaci forest), Dracseni (Lasului forest, Rugaria forest), Ivanesti (the neighboring beech woods and Scroafa forest), Obirseni de Sus (Lingurari forest, Ghintu forest, Obirseni forest), Gardesti (Helmeagloaia forest), Lingurari-Popesti (Popesti beech forest), Dragodiresti (Dragodiresti beech forest), Uricani (Uricani forest), Avramesti (wood), Putini (Putini forest), Salahorul-Colonesti (Colonesti beech forest), Spria (Spria beech forest), Tg. Glodurilor (the neighboring beech wood), Antonesti-Faghieni (neighboring woods), Loginca (Plesa beech forest), Otelesti and Lunca (neighboring beech woods), Obirsa (woods on the interfluvial area from the west), Leca (beech forest on the same interfluvial area from the east), Tg. Parincea-Horgesti village (Dealul Mare beech forest), and Racatau (eastern beech forest).

Toward the end of November 1952 we went through the forests belonging to the localities of Perieni (Scringhita forest), Poșoane, Tomesti (Balanesti forest), Halaresti-Politeni (Politeni forest), Mireni (Mireni forest, Icoana beech forest, Cociorva forest), Ciocani (Seaca forest), Cring (Cring forest).

New phytogeographic and floral facts, concerning either Moldova or only the Tutova hills, which have resulted from these studies are the discovery of *Quercus pubescens* Willd. (the pubescent oak) in numerous localities, the presence of *Q. pedunculiflora* C. Koch (peduncular oak) and of *Q. virgiliana* Ten. in several localities as well as the verification of the lack of *Fagus silvatica* L. (the beech) in a great portion of the territory which maps of existing vegetation have included in the beech zone.

The dendrological material collected has for the most part been determined by using for comparison, due to engineer Al. Beldie, material from the herbarium of the Institute for Forest Research and Experimentation in Bucharest, as well as in several cases the findings of professor C. C. Georgescu and engineer Al. Beldie.

#### I. FLORAL DATA

*Quercus pubescens* Willd. is mentioned in older writings in Moldova (quite a general and vague indication) at Nicorești, near Vaslui, at Valea Mosneagului (2), Bacau (13), Ocnesti-Bacau (5). According to "The Monograph of the Oaks" (10) (Figure 1) the area of the specie is advancing over the Covurlui terrace and, as an enclave, appears in the Trotusului valley. Burduja

found it at Cotnari-Iasi and announced it in the contents of a note of the RPR /Republica Populara Romania — Romanian People's Republic/ Academy at the Iasi branch on 2 December 1951.

Recently literature has registered the spreading of the specie only in Galati Rayon and Bujor Rayon (Covurlui terrace). We have located the specie, in the lanuginosa, undulata, and glomerata variations, in the following localities: Cring (Cring forest), Ciocani (Seaca forest), Perieni (Scringhita-Pogone forest), Tomesti (Balanesti forest), Lalesti (Muncel forest), Bancesti-Flintinele (the forest with the same name), Stincaseni (Vidrascu forest, Iezer forest, Cociuba forest), Corodesti (Corodesti forest, Magurei woods, Bulbuci woods), Micesti (Micesti forest), and Dracseni (Lasului forest, Cotirlaci forest). The localities of Obirseni (Lingurari forest on Ghintu hill), Putini (Putini forest), Salahoru (isolated examples in a cultivated field), and Antonesti and Faghieni (neighboring woods) in the Berheciului valley, represent the extreme northern points of the spreading of this specie in the area of the "hills."

The discovery of the specie in so many localities and even taking part in the formation of forests or constituting a single portion of some forest plains modifies the conception about its spreading and its geobotanical function in the Moldova area (5) (page 213).

The specie, spread (7) into southern Europe, Thuringia, Bohemia, Hungary, Rumania, "Podolia," Crimea, and Asia Minor, is probably also located more to the east and northeast of the "hills."

*Quercus virgilliana* Ten. is now noted for the first time in Moldova. The species has been encountered in the localities of Cring (Cring forest), Ciocani (Seaca forest), Tomesti (Balanesti forest), Stincaseni (Iezer wood), Micesti (Micesti forest), and Obirseni (Helmegioaia forest).

Describing this plant, of general distribution in southeast Europe and known to us from the regions shown on the map accompanying the monograph mentioned (10), with recent supplements (7), will require the determination for a search for it in the most appropriate areas for growth, that is, Rimbicul Sarat, and Dobrogea and in the region of the "hills," for geobotanical and areal purposes.

*Quercus pedunculiflora* C. Koch has been indicated (in the map from work 10) in Moldova from the Covurului terrace and from Iasi (according to the material collected by fellow member M. Ravarut, from Popricani) and recently also in Birlad Region, Focsani Rayon, but omitting the indication from Iasi.

We have located it at Cring (Cring forest), Ciocani (in marginal areas of Seaca forest), Stincaseni (Iezer wood), and Lalesti-Pintinele (Muncel-Pintinele forest).

The presence of the species, spread (1), (3), (9), and (16) through Asia Minor, Caucasia, and Transcaucasia, the Balkans, and the south USSR, can be presumed in the "hills," inasmuch as it exists to the east of the Prut in the USSR at the same latitude, while on the Nistru corridor its area increases as far as Soroca with extension to the west towards the "Baltilor" steppes.

We presume that the last 2 species are more widespread in the "hills," but the small number of places in which it has been located is due to the short time of research as well as to the fact that only the first of the 2 species has been suspected to exist in this area and accordingly sought after more closely.

We also mention that a plant hitherto unknown in Moldova, the specie *Lathyrus venetus* (Mill.) Wolf, f. *grandis* (Velen.) Maly, has been found in the Iezer wood (Stincaseni).

## II. GENERAL GEOBOTANICAL ECOLOGICAL DATA

### 1. Summary Geological Geographic Indications

The region which was the object of our studies represents a subunit of the Moldova Plain, contained between the rivers Siret and Birlad and limited to the north by the affluence of the latter with the Racova Brook.

From the geological point of view the region is characterized by an alternation of sand and clay with local bands of faults.

The relief of this area may be presented in a series of parallel elongated hills separated by narrow valleys filled with sands which predominate. In general the hills are oriented from northwest to southeast in conformance to the monoclinic geological structure of the region. The peaks of these hills are narrow while the slopes generally have an accentuated incline and are in an advanced stage of degradation, as a result primarily of the alternation of the strata of permeable and impermeable materials and as a result of the

deforestation carried out on a very intense and irrational scale.

We regret that we have not had available any kind of meteorological data about the territory studied because of the fact that throughout the whole region of the "hills," which is large, there does not exist one single meteorological station.

## 2. General Data on the Floral Composition of the Oak Forests

The most widespread elements which enter into the composition of all of the forests studied are *Quercus robur* L., *Quercus petraea* (Matt.) Liebl., *Acer campestre* L. With a more localized distribution we have *Q. polycarpa* Schur, *Carpinus betulus* L. (significant growth in the forests around the limit of the beech), *Tilia cordata* Mill., *Tilia tomentosa* Monch, *Ulmus* sp., *Cornus mas* L., *Acer tataricum* L., and *Praxinus excelsior* L. Among the shrubbery we note *Crataegus monogyna* Jacq. and *Eucynus verrucosa* Scop. A winter species frequently encountered is *Lithospermum purpureo-coeruleum* L.

## 3. Details on the Floral Composition of Some Oak Forests

(a) The Iezer-Stincaseni wood of Stincaseni Hill, on the lower part of its western slope, is composed of *Q. pubescens*, *Cornus mas*, *Acer tataricum*, *Q. petraea*, *Q. virgiliana*, *Q. pedunculiflora*, *Eucynus europaeus*, *Acer campestre*, *Crataegus monogyna*, *Q. robur*, *Lithospermum purpureo-coeruleum*, *Ballota nigra*, *Lathyrus niger*, *Lathyrus venetus* f. *grandis*, *Glechoma* sp., *Scutellaria altissima*, *Agrimonia eupatoria*, *Asparagus tenuifolius*, *Calamintha clinopodium*, *Centaurea urbanum*, *Chrysanthemum corymbosum*, *Fragaria* sp., *Rubus* sp., *Veronica chamaedrys*, *Galium rubioides*, and *Clematis vitalba*.

(b) On the same slope of the Vidrascu-Stincaseni wood, on the higher and more degraded parts we find *Q. petraea*, *Q. pubescens*, *Q. robur*, *Tenarium chamaedrys*, *Crataegus monogyna*, *Calamintha clinopodium*, *Lithospermum purpureo-coeruleum*, *Rosa* sp., *Euonymus verrucosa*, *Berteroa incana*, *Linaria genistifolia*, *Dorycnium herbaceum*, *Hipericum* sp., *Rhamnus cathartica*, *Rosa canina*, *Plomis tuberosa*, *Turitis glabra*, *Genista tinctoria*, and *Citrus* sp. The species of *Quercus* in this forest may be divided into the following: in the upper third *Quercus petraea* about 15%, while in the middle and lower thirds *Quercus pubescens* about 97%, *Q. robur* and *Q. petraea* about 3%.

The parts of the forest formed almost exclusively of *Quercus pubescens* and situated at its lower margin present an uncultivated discontinuity with *Botriochloa ischaemum*, *Dorycnium herbaceum*, etc.

(c) A comparable aspect is also presented by the predominant parts formed of *Q. pubescens*, that is, Scringhita-Pogoane forest (Perieni), Cociuba forest (Stincaseni), and Seaca wood (Ciocani) which may be considered from this point of view as the most representative. In these therefore there can easily be observed the slow growth and the abundant ramification of the trees, which are of reduced height, and the heavy damage and lack of cultivation (all with *Botriochloa*). Among the component species we have been able to identify are *Quercus pubescens* (with the varieties indicated), *Crataegus monogyna*, *Q. pedunculiflora*, and *Botriochloa ischaemum* (forming an almost compact cover to the naked eye).



#### 4. The Forest Composition of the Beech Forests

Forests generally consist of *Fagus silvatica* (either predominantly or in a high proportion), *Carpinus betulus* (at some points forming homogeneous portions of the forest), *Tilia tomentosa* (a high %), *Quercus petraea*, *Acer pseudoplatanus*, *Sorbus torminalis*, *Corylus avellana*, et al.

Outside of its continuous area, the beech also appears in isolated spots, entering into the composition of Politeni and Mireni forests where it attains at some points a sufficiently high %, and in Poiana-Homocosa forest (information from I. Siru).

#### 5. Observations on the Ecology and the Geobotanical Character of the Quercus Species

In the short time in which we have covered this region, we have made the following conclusions which require verification.

*Quercus pubescens* is regularly encountered on the hillsides "Inscrite" exposed to the south, southwest, and west. A typical example of this is presented by Obirseni wood on the Ghintu hill (the extreme northern point of *Q. pubescens* distribution in the "hills"), where *Q. pubescens* on the southern face of the hill appears in an almost pure stand. On the southwestern and western sides it gradually mixes with the other oak types, while on the northeast and north slopes it is completely replaced by beech and hornbeam for a distance of less than 100 km.

These same species are usually located (at the most northern points) on the most degraded portions of the alluvial hillsides.

The species shows a poor tendency for association with other species, localizing itself by preference either in strips, some of appreciable width, or as individual trees in the lower marginal parts of the forests.

For this reason, *Q. pubescens* does not appear to be excluded by the concurrence of other species of *Quercus* on the sandier parts of the hillsides, a fact which probably explains its existence on the substrata.

*Quercus pedunculiflora* has been encountered localized on the colluvial parts of the hillsides.

The other species of *Quercus* (*petraea*, almost constant, but *Robur* more rarely) occupy the upper part of the hillside and the peaks of the hills. *Quercus robur* is the species which can often be associated with *Q. pubescens* (a fact observed with more significance in the northern parts of the region) and with *Q. pedunculiflora*.

### III. DATA CONCERNING THE SOUTHERN LIMIT OF THE BEECH IN THE "TUTOVA HILLS"

In the vegetation map (6), the limit of the zone of the beech in the interior of the "hills" follows a line approximately parallel with Birlad Valley, crossing approximately to the south of Deleni, south of Haralesti, south of Turcului bridge, at Brahasesti, from where it makes a bend to the west to reach the valley of the Siret. Thus about 80% of the "hills" should belong to the beech zone.

The limit of the continuous area of beech, which we established as a result of our observations, has a much different line. It leaves from southeast of Vaslui, moving sinuously in an east-west direction as far as Tg. Gloduri, passing to the south of Bogdana, Micesti, climbing to the boundary line of the waters between Rahova and the affluence of the Tutova River, from here to the south of Colonesti from where it comes down into the Zeletin Valley encompassing the Bogdan Wood and then climbing up again to the east of Faghieni as far as Tg. Gloduri. From here the limit follows a line approximately north-south, passing near Otelesti, Lomina (Berheci valley), the village of Valea Salciei, and encompassing the forested massif of Dealul Mare, between Parincea-Corbeasca, finally reaching the Siret Valley.

We mention that the dotted portions of the 2 extremities of the limit (Figure 1) (Vaslui-Micesti and Valea Salciei-Siret) were drawn as an approximation on the basis of information from C. Birea for the eastern part and on the basis of deductions (observations on the west flank of Dealul Mare, between Parincea and Corbeasca) and information for the western part (we refer to the information from I. Sandru that the beech is found in the forested massifs of Vladnic-Toplea).

Through the establishment of the actual limit of the continuous area of beech, 35-40% of the "hills" still remain in the vegetation zone of the beech.

#### IV. PRACTICAL SUGGESTIONS

Beside the scientific importance of the facts reported, the discovery of these species of *Quercus* growing spontaneously here also has a practical aspect.

In the work of reforestation, within the struggle with erosion and making valuable the degraded terraces in these "hills," in some cases it will be also necessary to resort, at least in the initial stage, to *Q. pubescens*, which, different from the other oak species, prevents degradation from setting in on the terrain and which is also a valuable species from the point of view of the quality of the wood (4) and (8).

In the creation of protective zones and in the reforestation on terrain with deeper soil, there can be used with success *Quercus pedunculiflora*, which appears to be a very good specie for this purpose in steppe regions (14) and (15).

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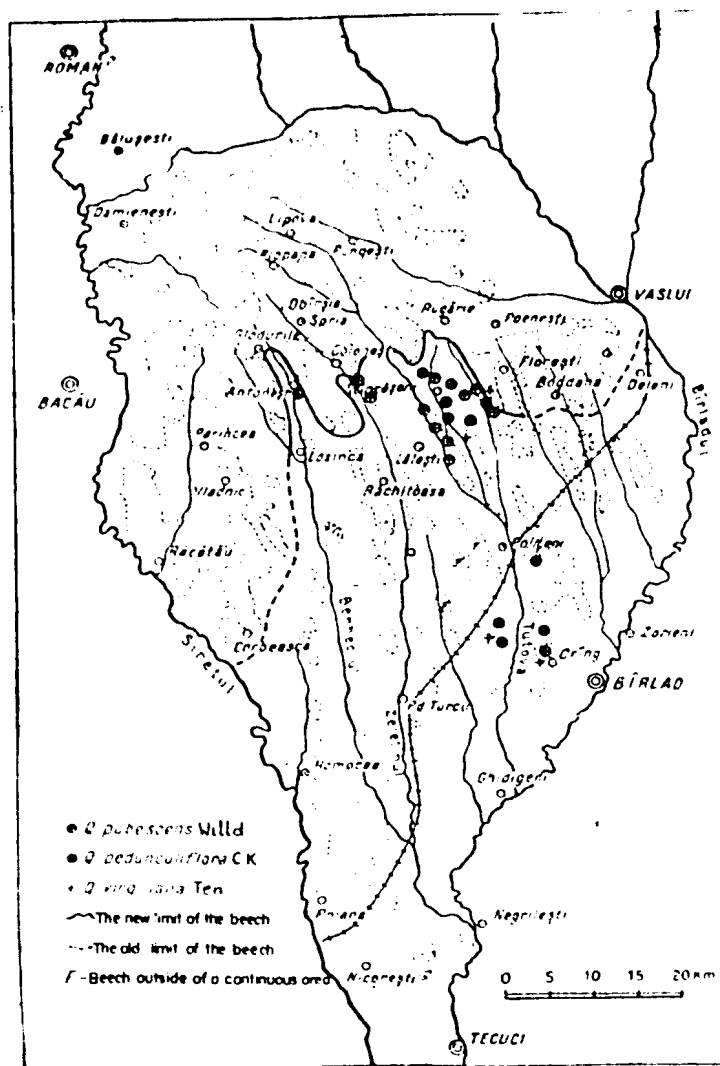


FIGURE 1